

AR-B5631 Board

**Socket P Intel® Core™2 Duo EPIC SBC with Intel® GME965 Express
Chipset, DVI/LCD, Singal LAN and PCI-104 Eexpansion**

User Manual

Manual Rev.: 1.01

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Revision: 1.0

Revision

Version	Date	Author	Description
1.0	2010/06/07	Roger Nan	Initial release
1.01	2010/07/06	Roger Nan	Modify descriptions

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1 INTRODUCTION

Welcome to the AR-B5631 Computer. The AR-B5631 is an Intel Core 2 Duo EPIC single board computer provides variety of display outputs. In addition to VGA, DVI and LVDS display outputs, AR-B5632 supports S-Video, BNC, and component TV outputs.

1.1 Features

- Processor: Core 2 Duo, Core Duo and Celeron M
- Chipsets: GME965 + ICH8M
- Memory: DDR2 667MHz SO-DIMM, Maximum 2GB
- Display: VGA, DVI, LVDS, S-Video, BNC, Component video
- Storage: 1x CF, 2x SATA II, 1x IDE
- Audio: Lin-in, Line-out, Mic-in
- Communication: 1x Gbps Ethernet, 6x USB 2.0, 1x RS-232, 1x RS-232/422/485
- General: Watchdog timer, 8-bit GPIO, and PCI-104 expansion slot.

Specifications

Item	Description
Processor	Socket for Intel uFC-PGA 478 Core 2 Duo/Core Duo/Celeron M
Chipsets	Intel GME965 + ICH8M
Memory	One SO-DIMM socket support 667/533 MHz DDR2 SDRAM. Max 2GB
Display	1 x VGA 1 x DVI-D TV out: Component Video or S-video or BNC Dual Channel 24-bit LVDS
USB	2 x USB 2.0(External) 4 x USB 2.0(Internal)
LAN	1 x GbE (Intel WG82574L) Supporting Boot From LAN(PXE)
Audio	Line-in, Line out and Microphone in
LED	Power and HDD LED pin header
Serial Ports	1 x RS-232(COM1) with DB9 1 x RS-232/422/485(COM2)
Storage	2 x SATA II Connectors 1 x 44-pin EIDE Connector 1 x CF II
Expansion Slot	1 x PCI-104
GPIO	8-bit independent TTL Level I/O

Watchdog Timer	256Levels (1~255 +/- 5%sec)
Hardware Monitoring	CPU Voltage CPU Temperature Fan Speed Voltage Monitor (12V, 5V, 3.3V)
Power Requirements	AT: Single +12V DC input AT and ATX Mode switched by jumper
Operating Temperature	0~60C degree
EMC	Design to meet CE/FCC Class B, EN60601

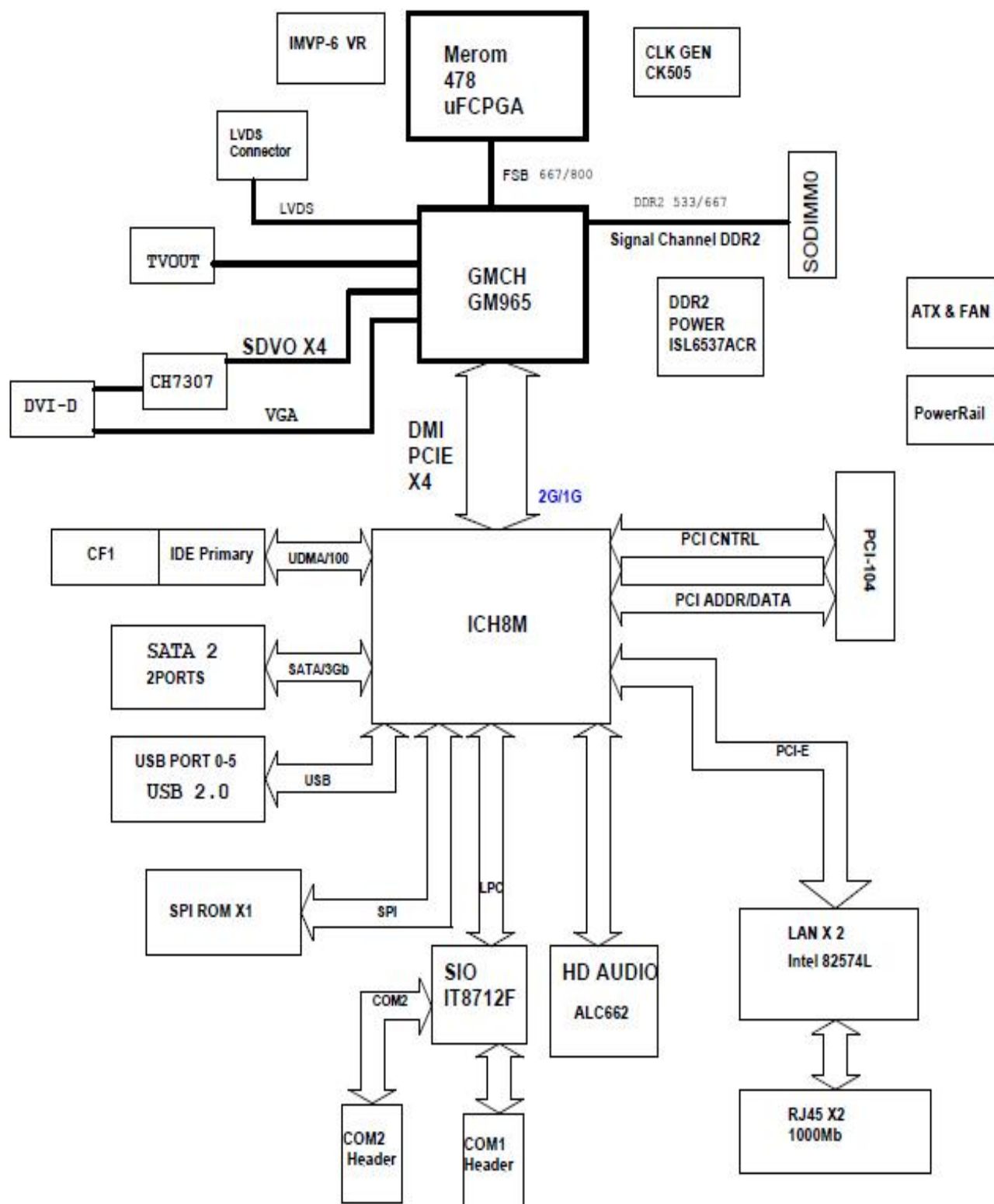


1.2 Package Contents

Check if the following items are included in the package.

- Quick Manual
- AR-B5631 board
- 1 x Software Utility CD

1.3 Block Diagram

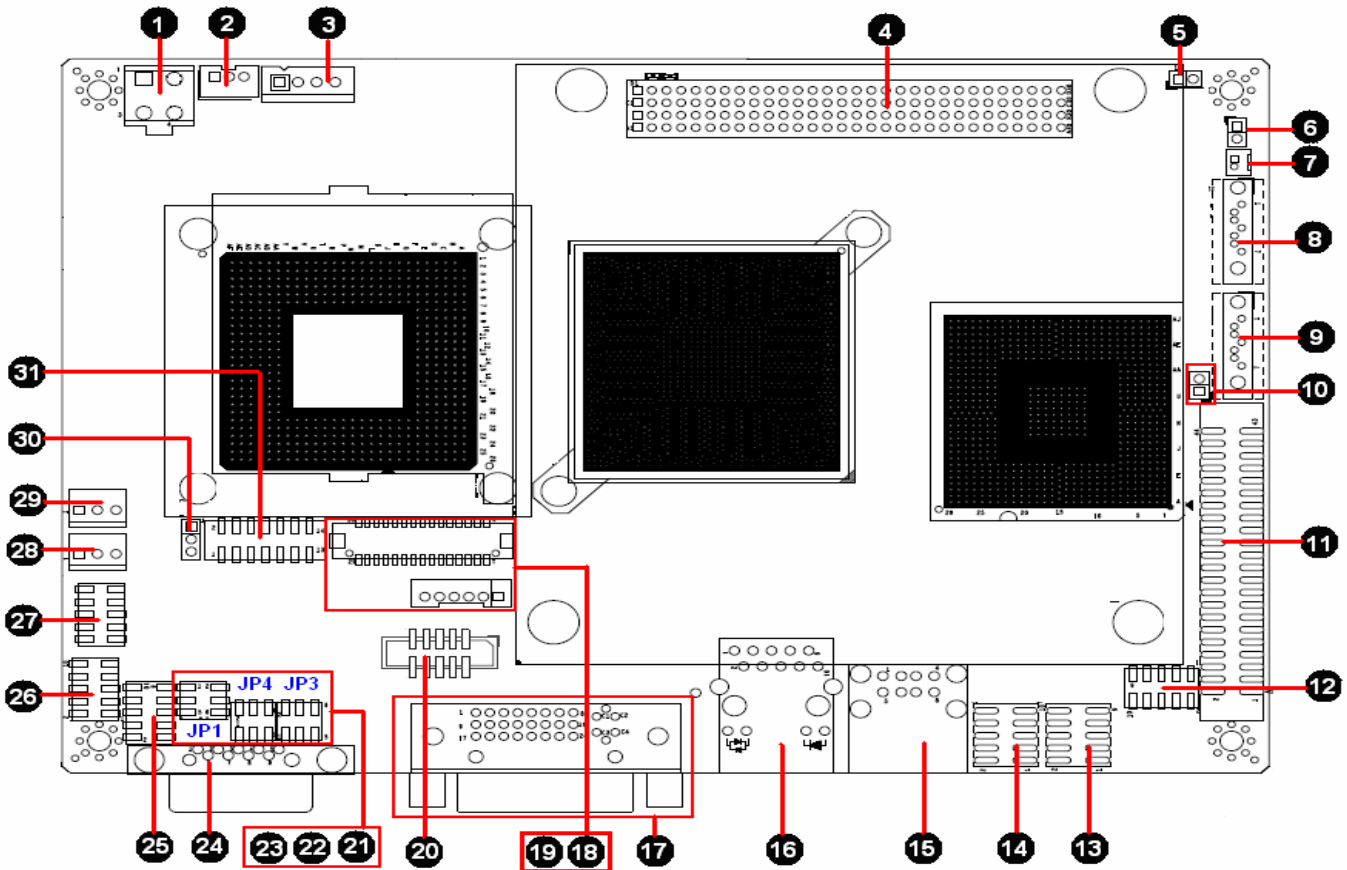


2 H/W INFORMATION

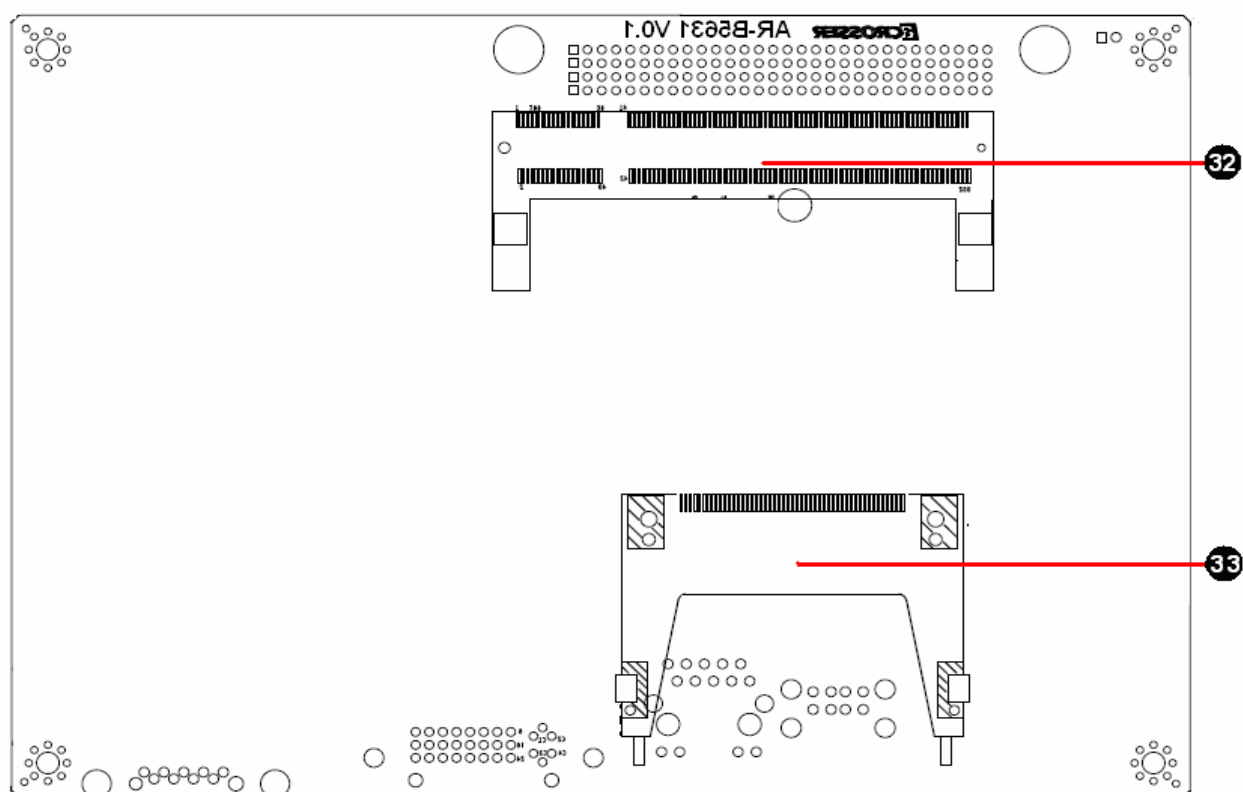
This chapter describes the installation of AR-B5631. At first, it shows the Function diagram and the layout of AR-B5631. It then describes the unpacking information which you should read carefully, as well as the jumper/switch settings for the AR-B5631 configuration.

2.1 Locations

2.1.1 Top Side



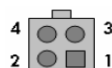
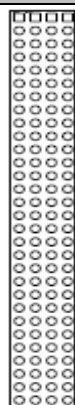
2.1.2 Bottom Side



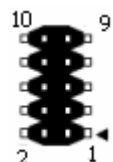
2.1.3 List of Connector and Jumper Setting

1	PWR2 External +12V DC power input connector.	13	USB3 Internal USB4, USB5 connector.	25	COM2* RS-232/422/485 signal connector for port #2.
2	CON2 ATX function connector.	14	USB2 Internal USB2, USB3 connector.	26	GPIO1 8-bit TTL-5V GPIO connector.
3	CON3 Extra +12V and +5V DC power output connector (for SATA device).	15	USB1 External USB0, USB1 connector.	27	AUDIO1 2 channels Audio signal connector.
4	J10 PCI-104 connector.	16	LAN1 RJ45 connector for Gigabit Ethernet port #1.	28	FAN2 System DC fan connector.
5	JP2 Signal SERIRQ connects to PCI-104 pin #B2 selection.	17	DVI1 Digital Video Interface (DVI-D).	29	FAN1 CPU DC fan connector.
6	J5 CMOS data retention/clear.	18	LCD1 LCD panel (LVDS, 18-bit/36-bit) connector.	30	J1 LCD panel driving voltage selection.
7	BAT1 CMOS battery holder.	19	LCDPW1 LCD panel inverter power connector.	31	TVCON1 TV-out signal connector.
8	SATA2 SATA device connector #2.	20	VGA1 Pin Header for D-Sub 15 Pin VGA.	32	SODIMM1 DDR2 SO-DIMM Slot.
9	SATA1 SATA device connector #1.	21	JP3 Select CON1 RS232/422/485.	33	CF1 CF card socket.
10	J8 CF master or slave select.	22	JP4 Select CON1 RS232/422/485.		
11	IDE1 PATA connector(UATA-100).	23	JP1 Select CON1 RS232/422/485.		
12	J12 Front panel connector. (NOTE 1)	24	COM1* RS232 signal connector for port #1.		

2.2 Connector and Jumper Setting Table

1. PWR2: External +12V DC power input connector.		2. CON2: ATX function connector.		3. CON3: Extra +12V and +5V DC power output connector (for SATA device).																													
	<table><tr><th>PIN</th><th>SETTING</th></tr><tr><td>1</td><td>GND</td></tr><tr><td>2</td><td>GND</td></tr><tr><td>3</td><td>+12V</td></tr><tr><td>4</td><td>+12V</td></tr></table>	PIN	SETTING	1	GND	2	GND	3	+12V	4	+12V		<table><tr><th>PIN</th><th>SETTING</th></tr><tr><td>1</td><td>GND</td></tr><tr><td>2</td><td>PS_ON</td></tr><tr><td>3</td><td>+5V_SUS</td></tr></table>	PIN	SETTING	1	GND	2	PS_ON	3	+5V_SUS		<table><tr><th>PIN</th><th>SETTING</th></tr><tr><td>1</td><td>+12V</td></tr><tr><td>2</td><td>GND</td></tr><tr><td>3</td><td>+3.3V</td></tr><tr><td>4</td><td>+5V</td></tr></table>	PIN	SETTING	1	+12V	2	GND	3	+3.3V	4	+5V
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4. J10: PCI-104 connector.		5. JP2: Signal SERIRQ connects to PCI-104 pin #B2 selection.		6. J5: CMOS data retention/clear.																													
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10. J8: CF master or slave select.		11. IDE1: PATA connector.																																																																																																			
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14. USB2: Internal USB2, USB3 connector.


PIN	SIGNAL	PIN	SIGNAL
1	+5V	2	+5V
3	USB_3-	4	USB_2-
5	USB_3+	6	USB_2+
7	GND	8	GND
9	GND	10	GND

15. USB1: External USB0, USB1 connector.

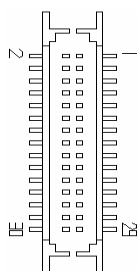

PIN	SIGNAL	PIN	SIGNAL
1	+5V	5	+5V
2	USB_1-	6	USB_0-
3	USB_1+	7	USB_0+
4	GND	8	GND

16. LAN1: RJ45 connector for Gigabit Ethernet port #1.


RJ45 connector for Gigabit Ethernet port #1.

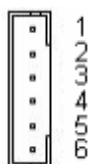
17. DVI1: Digital Video Interface (DVI-D).


PIN	SIGNAL	PIN	SIGNAL
1	TD2- (Digital red-)	13	N.C
2	TD2+ (Digital red+)	14	+VCC
3	GND	15	GND
4	N.C	16	Hot plug detect
5	N.C-	17	TD0- (Digital blue-)
6	DDC clock	18	TD0+ (Digital blue+)
7	DDC data	19	GND
8	N.C	20	N.C
9	TD1- (Digital green-)	21	N.C
10	TD1+ (Digital green+)	22	GND
11	GND	23	TCLK- (Digital clock-)
12	N.C	24	TCLK+ (Digital clock+)

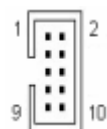
18. LCD1: LCD panel (LVDS, 18-bit/36-bit) connector.


PIN	SETTING	PIN	SETTING
1	LCD VDD	2	GND
3	E CLK-	4	E CLK+
5	GND	6	E Data2-
7	E Data2+	8	GND
9	E Data1-	10	E Data1+
11	NC	12	NC
13	E Data0+	14	E Data0-
15	GND	16	O CLK+
17	O CLK-	18	GND
19	O Data2+	20	O Data2-
21	I2C CLK	22	O Data1+
23	O Data1-	24	I2C Data
25	O Data0+	26	O Data0-
27	NC	28	NC
29	LCD VDD	30	LCD VDD

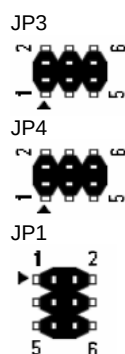
E: Even for dual channel.
O: Odd for single channel.

19. LCDPW1: LCD panel inverter power connector.


PIN	SETTING
1	+12V
2	+12V
3	GND
4	BKL ON
5	GND
6	Reserved.

20. VGA1: Pin Header for D-Sub 15 Pin VGA.


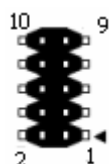
PIN	SIGNAL	PIN	SIGNAL
1	R	2	GND
3	G	4	GND
5	B	6	GND
7	VSYNC	8	SCL
9	HSYNC	10	SDA

21/22/23. JP3 & JP4 & JP1: Select CON1 RS232/422/485.


STATUS	SETTING		
	JP1	JP4	JP3
RS-232	1-2	1-3 2-4	1-3 2-4
RS-422	3-4	3-5 4-6	3-5 4-6
RS-485	5-6	3-5 4-6	N/A

24. COM1*: RS232 signal connector for port #1.

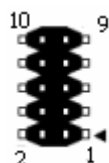

D-SUB-9 male connector for RS232 port #1.

25. COM2*: RS-232/422/485 signal connector for port #2.


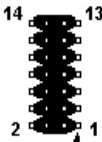
PIN	RS-232	RS-422	RS-485
1	DCD	N.C	N.C
2	DSR	RX-	N.C
3	RX	RX+	N.C
4	RTS	N.C	N.C
5	TX	N.C	N.C
6	CTS	TX-	DATA-
7	DTR	N.C	N.C
8	RI	TX+	DATA+
9	GND	GND	GND
10	GND	GND	GND

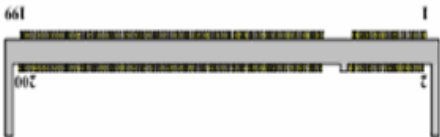
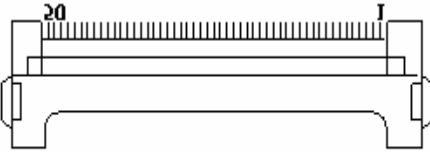
26. GPIO1:8-bit TTL-5V GPIO connector.


PIN	SETTING	PIN	SETTING
1	GPIO0 [30]	2	+5V
3	GPIO1 [31]	4	GPIO7 [37]
5	GPIO2 [32]	6	GPIO6 [36]
7	GPIO3 [33]	8	GPIO5 [35]
9	GND	10	GPIO4 [34]

27. AUDIO1: 2 channels Audio signal connector.


PIN	SETTING	PIN	SETTING
1	Line-out Right	2	Line-out Left
3	AGND	4	AGND
5	Line-in Right	6	Line-in Left
7	MIC-in	8	AGND
9	AGND	10	AGND

28. FAN2: System DC fan connector.		29. FAN1: CPU DC fan connector.																																							
	<table border="1"><thead><tr><th>PIN</th><th>SETTING</th></tr></thead><tbody><tr><td>1</td><td>GND</td></tr><tr><td>2</td><td>+12V</td></tr><tr><td>3</td><td>Fan speed data</td></tr></tbody></table> ON/OFF controlled by system temperature setting of BIOS.	PIN	SETTING	1	GND	2	+12V	3	Fan speed data		<table border="1"><thead><tr><th>PIN</th><th>SETTING</th></tr></thead><tbody><tr><td>1</td><td>GND</td></tr><tr><td>2</td><td>+12V</td></tr><tr><td>3</td><td>Sense</td></tr></tbody></table>	PIN	SETTING	1	GND	2	+12V	3	Sense																						
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3	Fan speed data																																								
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3	Sense																																								
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32. SODIMM1: DDR2 SO-DIMM SLOT.	33. CF1: CF CARD SOCKET.
	

- *:1. COM1 is the external UART RS-232 port, the text description on the PCB board is "CON1".
- *:2. COM2 is the internal UART RS-232/422/485 port, the text description on the PCB board is "COM1".

3 BIOS SETTING

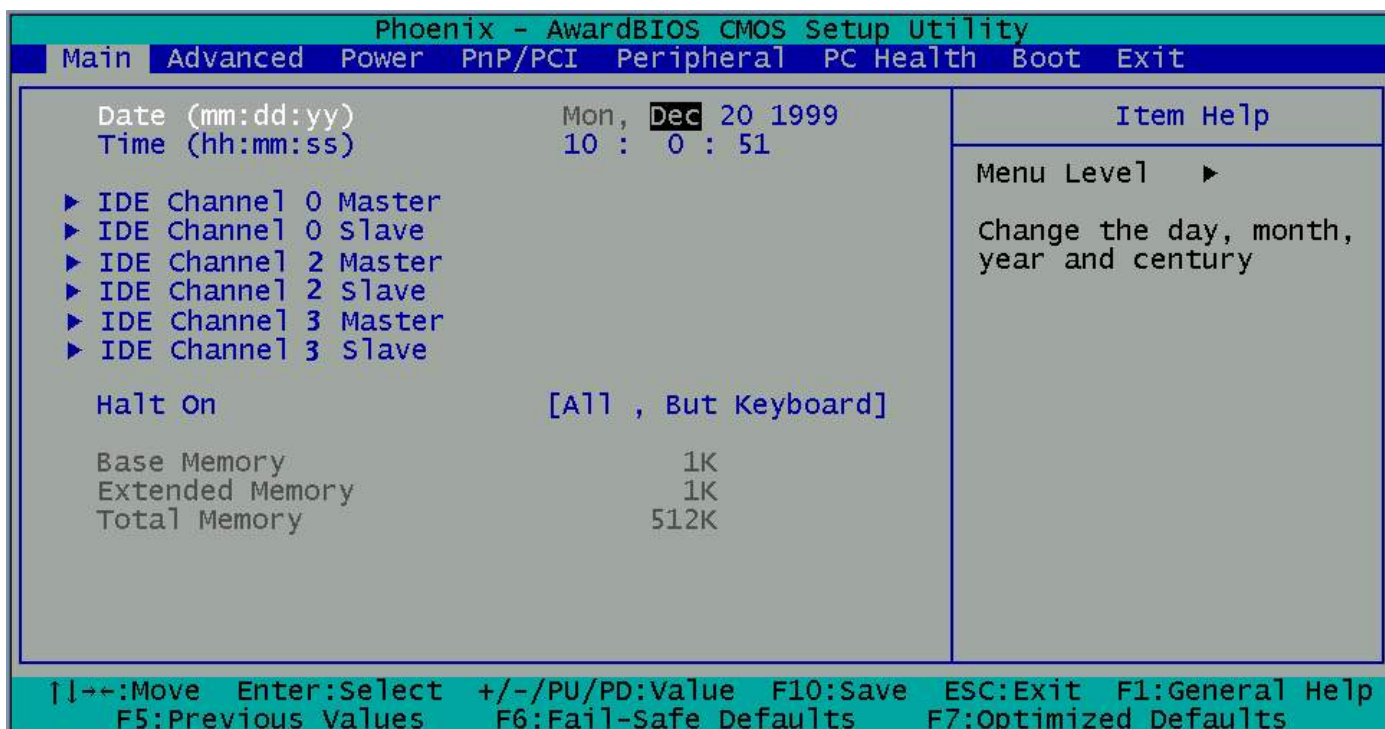
This chapter describes the BIOS menu displays and explains how to perform common tasks needed to get the system up and running. It also gives detailed explanation of the elements found in each of the BIOS menus. The following topics are covered:

- Main Setup
- Advanced Chipset Setup
- Power Setup
- PnP/PCI Setup
- Peripherals Setup
- PC Health Setup
- Boot Setup
- Exit Setup

Once you enter the Award BIOS™ CMOS Setup Utility, the Main Menu will appear on the screen. Use the arrow keys to highlight the item and then use the <Pg Up> <Pg Dn> keys to select the value you want in each item.

3.1 Main Setup

The <Main Setup> choice allows you to record some basic hardware configuration in your computer system and set the system clock and error handling. If the motherboard is already installed in a working system, you will not need to select this option. You will need to run this Setup option, however, if you change your system hardware configuration, the onboard battery fails, or the configuration stored in the COMS memory was lost or damaged.

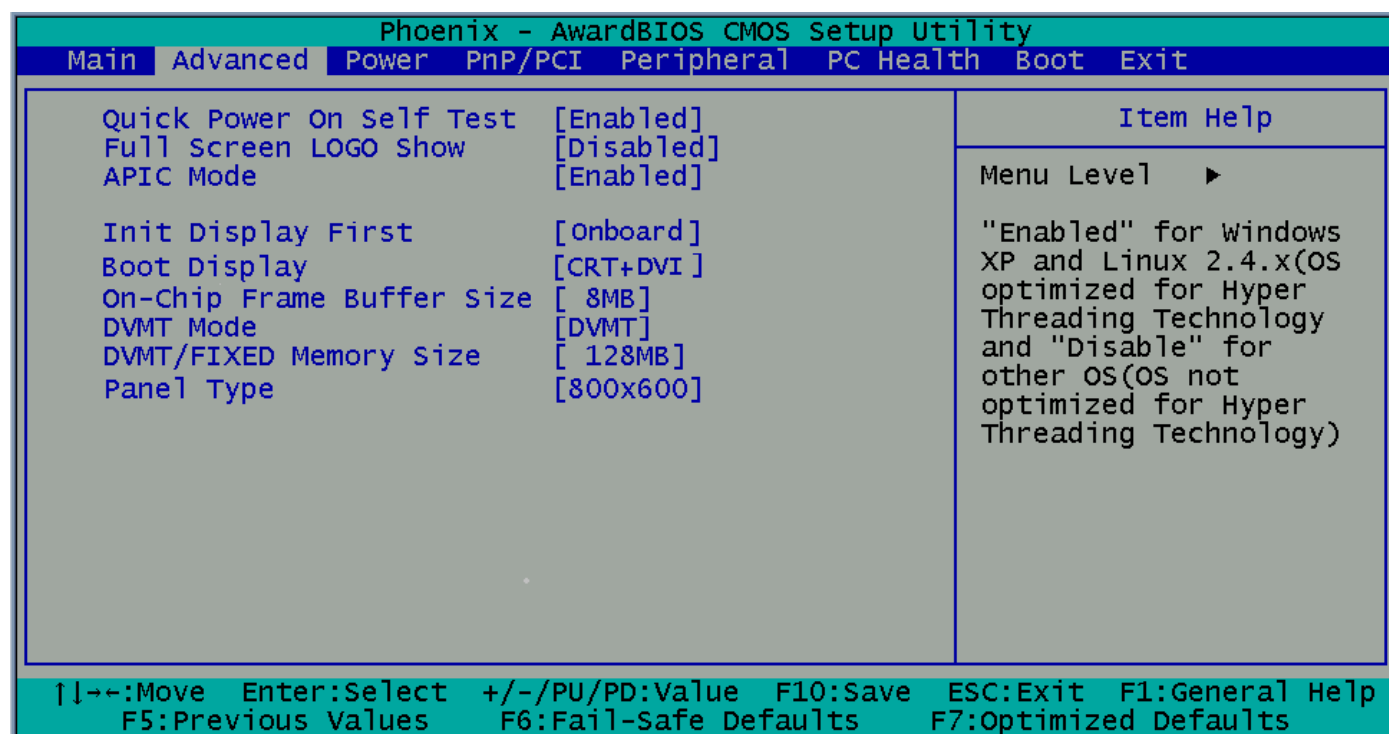


Note: Listed at the bottom of the menu are the control keys. If you need any help with the item fields, you can press the <F1> key, and it will display the relevant information.

Option	Choice	Description
Date Setup	N/A	Set the system date. Note that the 'Day' automatically changes when you set the date
Time Setup	N/A	Set the system time
IDE Channel 0 Master/Slave	N/A	The onboard IDE connectors provide 1 channel for connecting up to 2 IDE hard disks or other devices. The first is the "Master" and the second is "Slave", BIOS will auto-detect the IDE type.
IDE Channel 1 Master/Slave	N/A	The onboard IDE connectors provide 1 channel for connecting up to 2 IDE hard disks or other devices. The first is the "Master" and the second is "Slave", BIOS will auto-detect the IDE type.
IDE Channel 2 Master/Slave	N/A	The onboard IDE connectors provide 1 channel for connecting up to 2 IDE hard disks or other devices. The first is the "Master" and the second is "Slave", BIOS will auto-detect the IDE type.
Halt On	All Errors, No Errors, All but keyboard.	Select the situation in which you want the BIOS to stop the POST process and notify you.

3.2 Advanced Chipset Setup

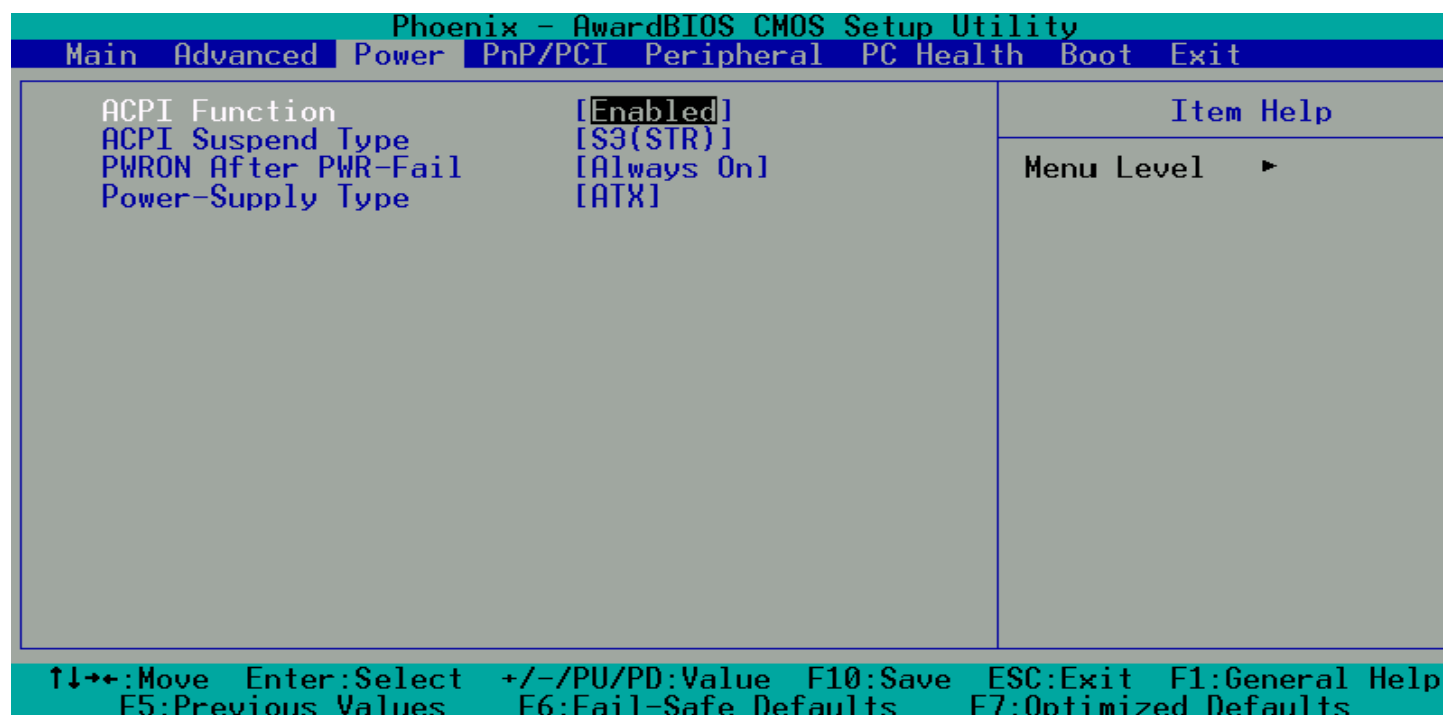
This section allows you to configure and improve your system and follows you to set up some system features according to your preference.



Option	Choice	Description
Quick Power On Self Test	Enabled Disabled	This category speeds up Power On Self Test (POST) after you have powered up the computer. If it is set to Enable, BIOS will shorten or skip some check items during POST.
Full Screen Logo Show	Enabled Disabled	Select Enabled to show the OEM full screen logo if you have add-in BIOS.
VGA Share Memory Size	1M 8M	This Item is for setting the Frame Buffer (Share system memory as display memory).
Boot Display	CRT DVI LCD TV CRT+DVI CRT+LCD CRT+TV	This Item is to set display device

3.3 Power Setup

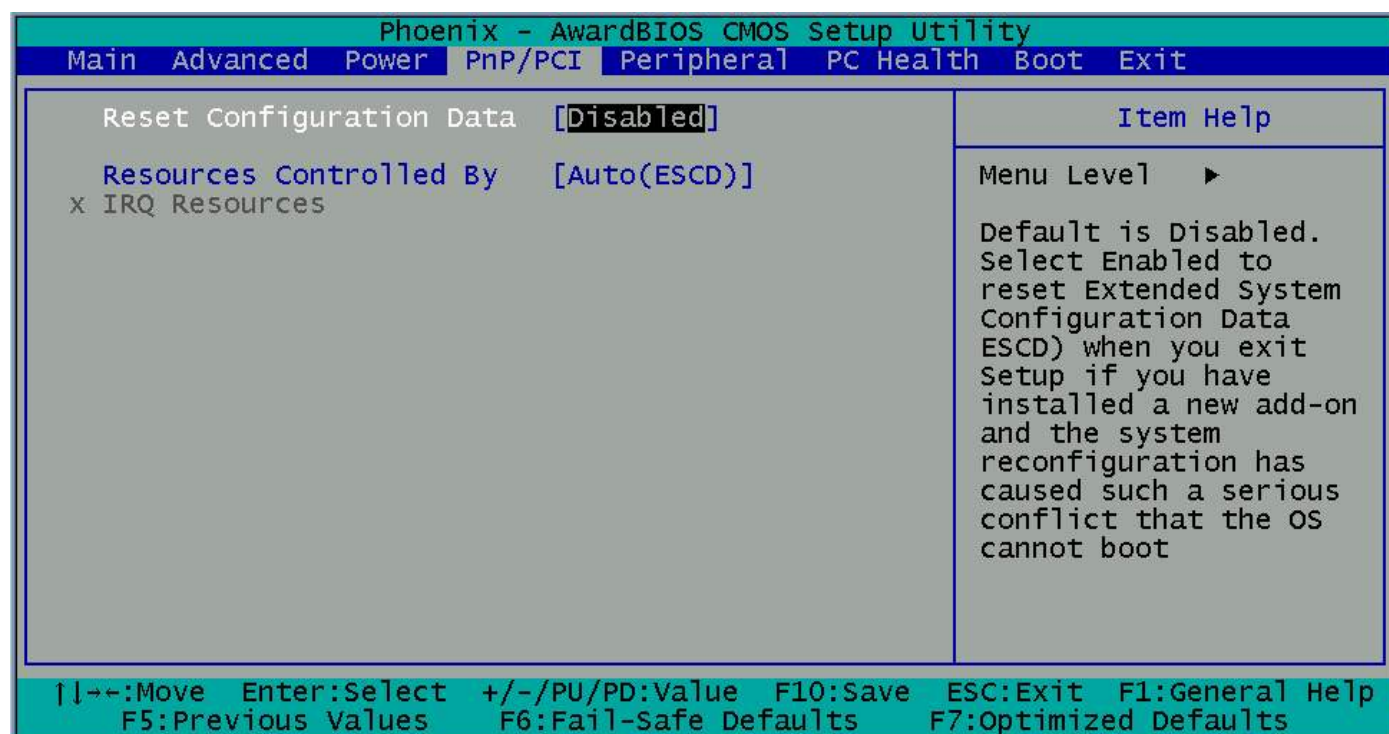
Use this main to specify your setting for power management.



Option	Choice	Description
ACPI Function	Enabled Disabled	Enable this function to support ACPI (Advance Configuration and Power Interface).
ACPI Suspend Type	S1 (POS) S3 (STR) S1+S3.	This options for this field are S1 (POS) and S3 (STR). By default, the field is set to S1 (POS) PWRON After PWR-Fail.
Power -Supply Type	AT ATX	This item allows you to choose the Type of Power Supply in use.The Choice: AT, ATX.

3.4 PnP/PCI Setup

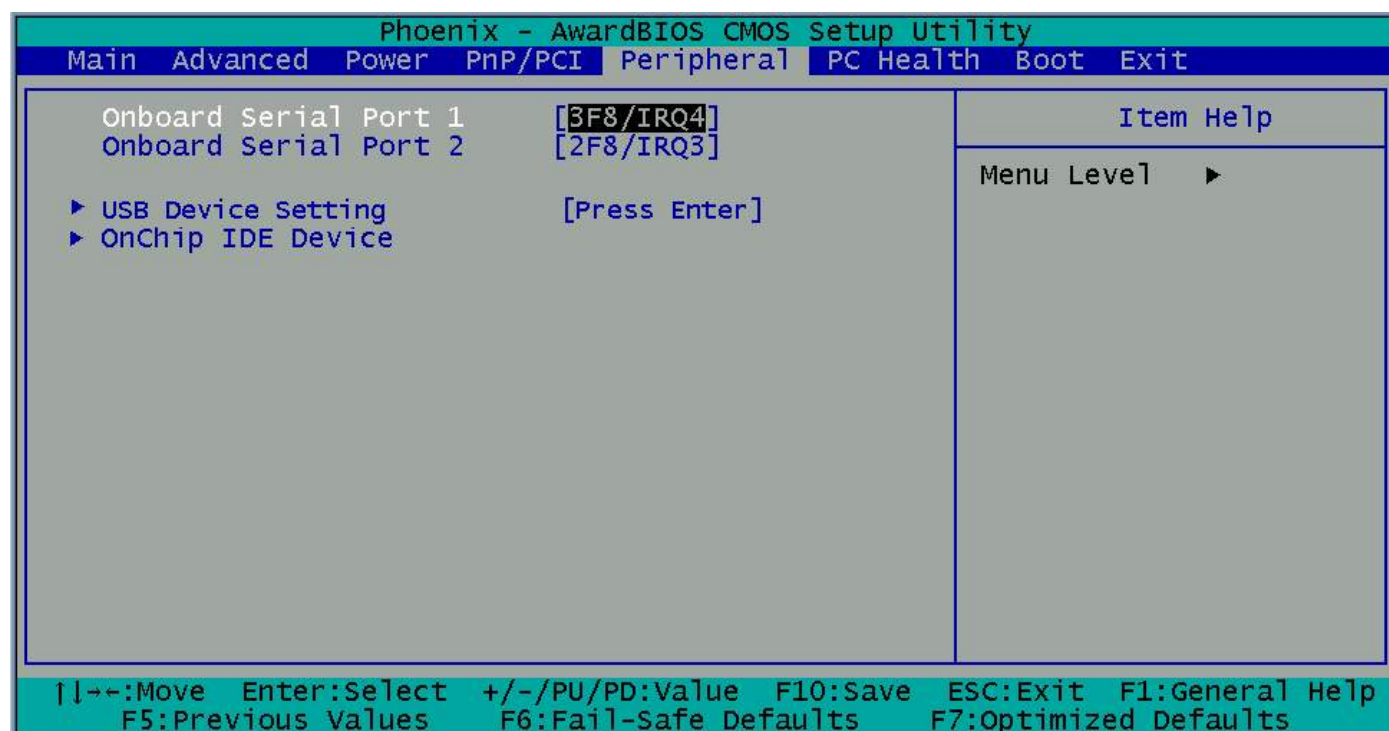
The option configures the PCI bus system. All PCI bus system on the system use INT#, thus all installed PCI cards must be set to this value.



Option	Choice	Description
Reset Configuration Data	Enabled Disabled	Normally, you leave this field Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup. If you have installed a new add-on and the system reconfiguration has caused such a serious conflict, then the operating system cannot boot.
Resources Controlled By	Auto(ESCD) Manual	The Award Plug and Play BIOS has the capacity to automatically configure all of the boot and Plug and Play compatible devices. However, this capability means absolutely nothing unless you are using a Plug and Play operating system such as Windows 95. If you set this field to "manual," then you may choose specific resources by going into each of the submenus.
IRQ Resources	N/A	When resources are controlled manually, assign a type to each system interrupt, depending on the type of the device that uses the interrupt

3.5 Peripherals Setup

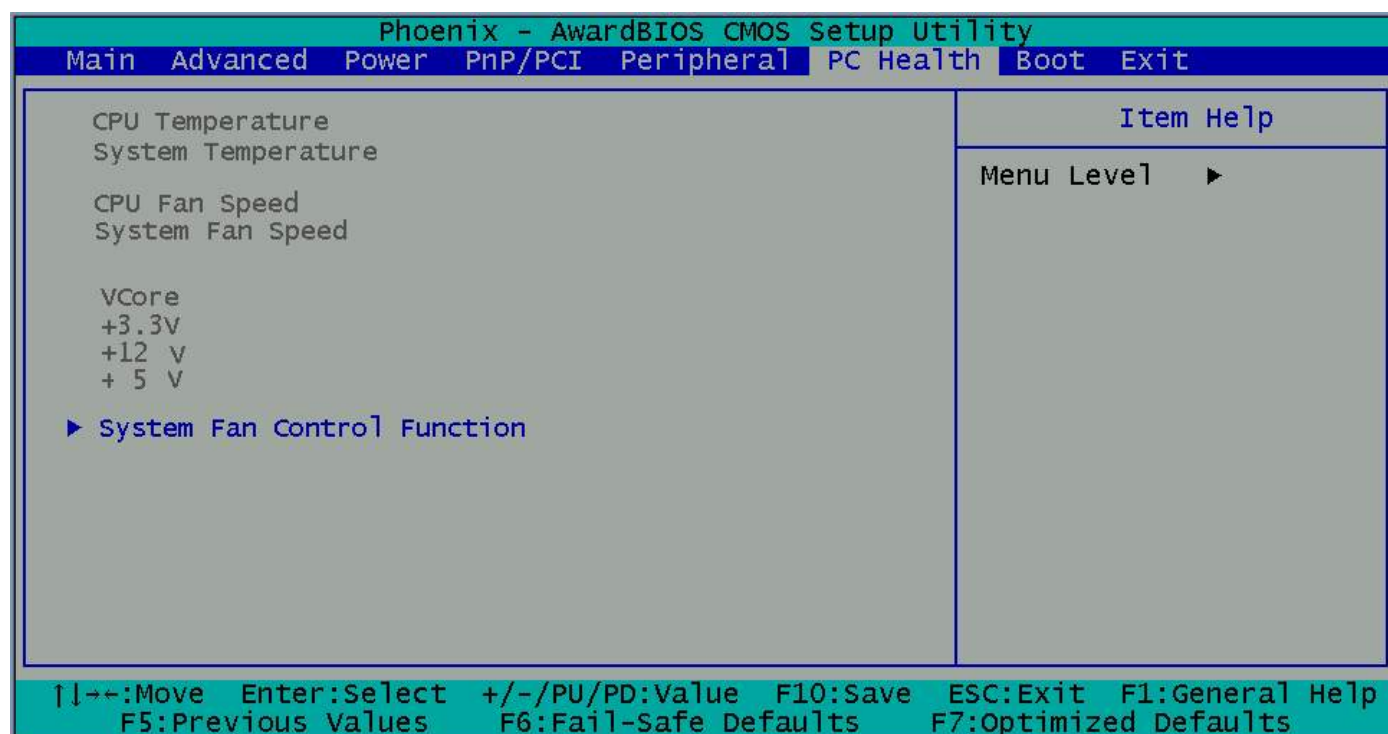
This option controls the configuration of the board's chipset. Control keys for this screen are the same as for the previous screen.



Option	Choice	Description
Onboard Serial Port 1 Onboard Serial Port 2	Serial Port 1: 3F8 / IRQ11 Serial Port 2: 2F8 / IRQ10	Select an address and the corresponding interrupt for each serial port.
USB Device Setting	Enabled Disabled	Select <i>Enabled</i> if your system contains a Universal Serial Bus (USB) 2.0 controller and you have USB peripherals
On chip IDE DEVICE		The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select Enabled to activate each channel separately.

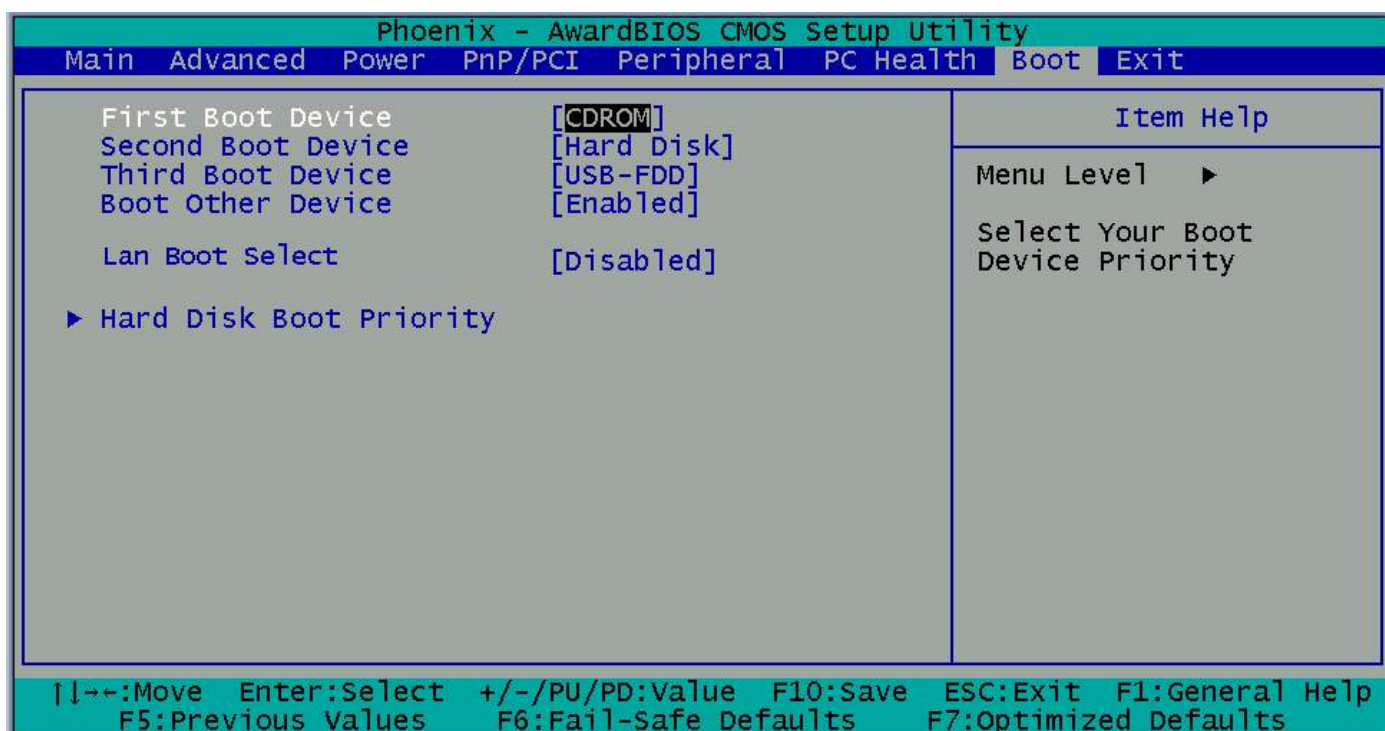
3.6 PC Health Setup

This section shows the parameters in determining the PC Health Status. These parameters include temperatures, fan speeds, and voltages.



3.7 Boot Setup

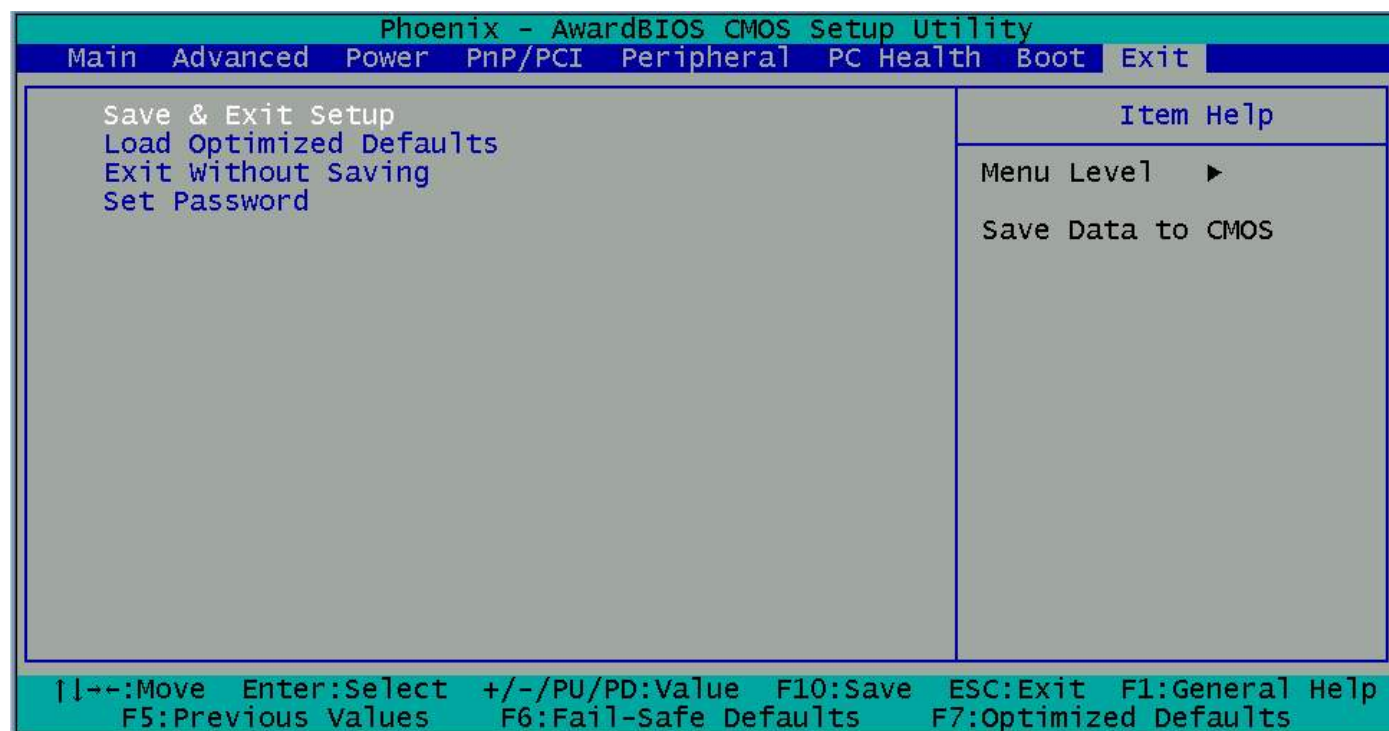
This section is used to exit the BIOS main menu. After making your changes, you can either save them or exit the BIOS menu and without saving the new values.



Option	Choice	Description
First / Second / Third Boot Device/Other Boot Device	Hard Disk CDROM USB-FDD USB-CDROM Disabled	The BIOS attempts to load the operating system from the devices in the sequence selected in these items.
Hard Disk Boot Priority	N/A	These fields set the Boot Priority for each Hard Disk (SATA/IDE HDD and USB Flash)

3.8 Exit Setup

This section is used to configure exit mode.



Option	Choice	Description
Save & Exit Setup	Pressing <Enter> on this item for confirmation: Save to CMOS and EXIT (Y/N)? Y	Press "Y" to store the selections made in the menus in CMOS – a special section of memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configures your system according to the Setup selections stored in CMOS. After saving the values the system is restarted again
Load Optimized Defaults	When you press <Enter> on this item you get a confirmation dialog box with a message like this: Load Optimized Defaults (Y/N)? N	Press 'Y' to load the default values that are factory-set for optimal-performance system operations.
Exit Without Saving	Pressing <Enter> on this item for confirmation: Quit without saving (Y/N)? Y	This allows you to exit Setup without storing any changes in CMOS. The previous selections remain in effect. This shall exit the Setup utility and restart your computer.

Set Password	Pressing <Enter> on this item for confirmation: ENTER PASSWORD:	When a password has been enabled, you will be prompted to enter your password every time you try to enter Setup. This prevents unauthorized persons from changing any part of your system configuration. Type the password, up to eight characters in length, and press <Enter>. The password typed now will clear any previous password from the CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the selection and not enter a password. To disable a password, just press <Enter> when you are prompted to enter the password. A message will confirm that the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.
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- Watch Dog Timer Reset Sample Code (IT8712F-A/IX-L)

The WDT (Watch Dog Timer) is used to generate a variety of output signals after a user programmable count. The WDT is suitable for use in the prevention of system lock-up, such as when software becomes trapped in a deadlock. Under these sorts of circumstances, the timer will count to zero and the selected outputs will be driven. Under normal circumstance, the user will restart the WDT at regular intervals before the timer counts to zero.

The watchdog timer is a circuit that maybe used from your program software to detect crash or hang up. The Watchdog timer is automatically disabled after reset. Once you enabled the watchdog timer, your program should trigger the watchdog timer every time before it times out. After you trigger the watchdog timer, the timer will be set to zero and start to count again. If your program fails to trigger the watchdog timer before times out, it will generate a reset pulse to reset the system or trigger the IRQ 9 signal in order to tell your system that the watchdog time is out.

User could test watchdog function under 'Debug' program as follows:

```
C:>debug
o 2E 87 ;Extended Functions Enable Register
o 2E 01 ;Extended Functions Enable Register
o 2E 55 ; Extended Functions Enable Register
o 2E 55 ; Extended Functions Enable Register
o 2E 07 ;EFIR=EFER (Extended Functions Index Register)
        point to Logical Device Number Reg.
o 2F 07 ; Select logical device 7, (Watchdog Function)
o 2E 23 ; Clock Source Select of Watch Dog Timer
o 2F 10 ; Select Eeternal CLKIN
o 2E 72 ; Select Watchdog count mode seconds or minutes
o 2F C0 ; Default is second and KBRST mode.
o 2E 73 ; Select Watchdog Timer Value
o 2F 08 ;update CRF6 with value 08H ,(8sec reset)
```

```
// Set Watchdog
    outportb(IO_Port_Address,0x07);    // Point to Logical Device Number Reg.
    outportb(IO_Port_Address+1,0x07);  // Select logical device 7, (Watchdog Function)

    outportb(IO_Port_Address,0x23); // Select Watchdog use CLKIN
    outportb(IO_Port_Address+1,inportb(IO_Port_Address+1)|0x10);

    outportb(IO_Port_Address,0x72); // Select Watchdog use keyboard reset
    outportb(IO_Port_Address+1,0x40);

    outportb(IO_Port_Address,0x72); // Select Watchdog count mode seconds or minutes
    outportb(IO_Port_Address+1,inportb(IO_Port_Address+1)|0x80); // Set Second

    outportb(IO_Port_Address,0x73); // Set Watchdog Timer Value
    outportb(IO_Port_Address+1,Time); // 0x00 to disable, max 0xFF
```

■ **NOTE 1:****J12: Front panel connector.**

STATUS	SETTING
1, 2	Standby power indicator LED 1: LED+ 2: LED-
3, 4	HDD access indicator 3: LED+ 4: LED-
5, 6	External buzzer. 5: Buzz + 6: Buzz -
7-8	Hardware reset
9-10	Power button for ATX mode; jumper shorted for AT mode.

When using **AT mode** in the system, the pin9-10 of header **J12** must be shorted. If using **ATX mode** in the system, the pin9-10 of header **J12** should connect to a **Push-Button-Switch**.
*The default setting is shorted the pin 9-10 of header **J12** with a jumper.*

NOTE: When using AT mode, the monitor will not display any message and the system will not auto-shut down after soft-off. In this case, please cut the PSU's power off or remove PSU's power to cut the system power off.